WHAT IS CLAIMED IS:

1. A method of fabricating an X-ray mask comprising steps of:

forming an X-ray transmitter; and

forming a laminated X-ray absorber above said X-ray transmitter, wherein

at least two types of layers having different compositions are employed for said laminated X-ray absorber.

2. The method of fabricating an X-ray mask according to claim 1, wherein

said laminated X-ray absorber includes a first X-ray absorber formed above said X-ray transmitter and a second X-ray absorber formed to be in contact with said first X-ray absorber,

tungsten is employed as the material for one of said first X-ray absorber and said second X-ray absorber, and

diamond is employed as the material for the other one of said first X-ray absorber and said second X-ray absorber.

3. The method of fabricating an X-ray mask according to claim 1, wherein

said laminated X-ray absorber includes a first X-ray absorber formed on said X-ray transmitter and a second X-ray absorber formed on said first X-ray absorber,

said method of fabricating an X-ray mask further comprising steps of:

forming a film serving as an etching stopper when etching said first X-ray absorber on said X-ray transmitter, and

forming said second X-ray absorber on said film serving as an etching stopper.

4. The method of fabricating an X-ray mask according to claim 1, wherein

said laminated X-ray absorber includes a first X-ray absorber formed above said X-ray transmitter and a second X-ray absorber formed on said first X-ray absorber,

said method of fabricating an X-ray mask further comprising steps of:

forming an interlayer film having either a function for serving as an etching stopper or a function for serving as a hard mask on said first X-ray absorber, and

forming said second X-ray absorber on said interlayer film.

5. The method of fabricating an X-ray mask according to claim 1, wherein

said laminated X-ray absorber has a layer containing at least one substance selected from a group consisting of lithium (Li), beryllium (Be), boron (B), carbon (C), sodium (Na), magnesium (Mg), aluminum (Al), silicon (Si), phosphorus (P), sulfur (S), potassium (K), calcium (Ca), scandium (Sc), titanium (Ti), vanadium (V), chromium (Cr), manganese (Mn), iron (Fe), cobalt (Co), nickel (Ni), copper (Cu), zinc (Zn), gallium (Ga), germanium (Ge), arsenic (As), selenium (Se), palladium (Pd), silver (Ag), cadmium (Cd), indium (In), tin (Sn), antimony (Sb), tellurium (Te), cesium (Cs), barium (Ba), mixtures of these elements, a carbide including silicon carbide or tungsten carbide, a nitride such as silicon nitride, aluminum nitride or chromium nitride, an oxide including silicon oxide or chromium oxide, a fluoride and an iodide.

6. The method of fabricating an X-ray mask according to claim 1, wherein

said laminated X-ray absorber has a layer containing a substance selected from a group consisting of carbon (C), titanium (Ti), vanadium (V), chromium (Cr), manganese (Mn), iron (Fe), nickel (Ni), copper (Cu), zinc (Zn), gallium (Ga), germanium (Ge), arsenic (As), selenium (Se), palladium (Pd), silver (Ag), cadmium (Cd), indium (In), tin (Sn), antimony (Sb) and tellurium (Te).

7 A method of fabricating an X-ray mask comprising steps of:

forming a dug portion and a portion other than said dug portion on an X-ray transmitter; and

forming an X-ray absorber on said portion other than said dug portion.

8 The method of fabricating an X-ray mask according to claim 7 further comprising a step of performing ion implantation into said X-ray transmitter before forming said dug portion.

9 The method of fabricating an X-ray mask according to claim 1, wherein said step of forming said X-ray absorber includes steps of:

forming an X-ray transmitter;

forming a first X-ray absorber above said X-ray transmitter; and

forming a second X-ray absorber, different in pattern size from said first X-ray absorber, on said first X-ray absorber.

10. The method of fabricating an X-ray mask according to claim 9, wherein

the pattern size of said first X-ray absorber is larger than the pattern size of said second X-ray absorber.

11. A method of fabricating a semiconductor device carrying out an exposure step with an X-ray mask on condition that geometric X-ray phase difference between the phase of X-rays transmitted through an X-ray transmission part of said X-ray mask and the phase of X-rays transmitted through an X-ray absorber of said X-ray mask is in the range including 0.5π and in proximity to 0.5π between a resist film located on a position for forming an optical image with said X-rays and said X-ray mask, wherein

said X-ray mask comprises an X-ray transmitter and said X-ray absorber consisting of a laminated structure having at least two layers formed on said X-ray transmitter,

said laminated structure includes at least two layers having different

compositions, and

at least either a condition that the phase shift quantity of said X-rays transmitted through said X-ray absorber is in the range of 0.3π to 0.6π or a condition that the transmittance of said X-rays transmitted through said X-ray absorber is in the range of 30 % to 60 % holds.

12. The method of fabricating a semiconductor device according to claim 11, carrying out said exposure step on condition that an average exposure wavelength of X-rays is longer than 0.3 nm and shorter than 0.7 nm.

13. The method of fabricating a semiconductor device according to claim 11, wherein:

the absolute value of the difference between said geometric phase difference and said phase shift quantity is in the range including π and in proximity to π.